CLAIMS

[1] A solid-state imaging device comprising a plurality of unit pixels which are two-dimensionally arranged,

wherein each of said unit pixels includes:

a photoelectric conversion part which converts incident light into electric charges;

a convex lens layer which is formed above said photoelectric conversion part, and through which the incident light is transmitted; and

a concavo-convex lens layer which is formed on and around said lens layer, and which collects the incident light and outputs the incident light to said lens layer.

[2] The solid-state imaging device according to Claim 1,

wherein said lens layer includes a light-transmission film having a shape of concentric circles in which a ratio of a total line-width to a periodic width varies depending on a plurality of zones, each of which is obtained by dividing said light-transmission film by a predetermined periodic width in an in-plane direction.

[3] The solid-state imaging device according to Claim 1,

wherein a refractive index of said lens layer is greater than a refractive index of said lens layer.

[4] The solid-state imaging device according to Claim 1, further comprising

a wavelength separation part which is formed above said photoelectric conversion part and through which light of a predetermined wavelength range is transmitted,

wherein a thickness and a width of said lens layer are set to achieve a predetermined focal length for the light of the

predetermined wavelength range.

[5] The solid-state imaging device according to Claim 1,

wherein said lens layer is made of one of boron phosphorous silicon glass, tetra ethoxy silane, benzocyclobutene, and polyimide resin.

[6] The solid-state imaging device according to Claim 1,

wherein said lens layers have a part where said lens layers are getting thinner from a center of said pixel towards a periphery of said pixel.

[7] The solid-state imaging device according to Claim 1,

wherein said lens layer has a concentric shape whose center is not immediately above a center of said photoelectric conversion part.

[8] A method for manufacturing a solid-state imaging device comprising a plurality of unit pixels which are two-dimensionally arranged,

wherein each of the unit pixels includes:

a photoelectric conversion part which converts incident light into electric charges;

a convex lens layer which is formed above the photoelectric conversion part, and through which the incident light is transmitted; and

a concavo-convex lens layer which is formed on and around the lens layer, and which collects the incident light and outputs the incident light to the lens layer,

said method comprising:

forming a material layer on a base in order to form the lens layer;

forming a resist film on the material layer;

forming a pattern on the material layer in which a distance between the resist films is increased from a center of the pixel towards a periphery of the pixel;

etching the material layer up to a point where the material layer outside of said pattern still remains.

[9] A camera comprising a solid-state imaging device that includes a plurality of unit pixels which are two-dimensionally arranged,

wherein each of said unit pixels includes:

a photoelectric conversion part which converts incident light into electric charges;

a convex lens layer which is formed above said photoelectric conversion part, and through which the incident light is transmitted; and

a concavo-convex lens layer which is formed on and around said lens layer, and which collects the incident light and outputs the incident light to said lens layer.